Explanation of the Toxicity Characteristic Leaching Procedure (TCLP) and its Planned Use

Introduction

The 200-acre West Lake Landfill Superfund site includes two areas that received soil contaminated with radiological materials. This fact sheet explains a test that EPA is planning to perform on radiologically impacted material (RIM) from West Lake Landfill to understand where radium in groundwater is coming from. The test is called a toxicity characteristic leaching procedure, or TCLP.

The radioactive element radium has been found in groundwater under West Lake Landfill (see Figure 1). Radium in groundwater can be from different sources, including:

- naturally occurring rocks and ordinary waste materials in the landfill (for example, pre-1970 watches and clocks, fertilizers, objects made from granite).
- illegally dumped RIM.

The RIM in the landfill originated at a facility in downtown St. Louis, which processed uranium ores. The Superfund law requires the remediation of RIM at West Lake Landfill. It does not require remediation of naturally occurring materials or ordinary waste.

The December 2014 USGS report on groundwater concluded that there is not enough data to determine why dissolved combined radium (radium 226 and 228) is above the maximum contaminant level (MCL) for drinking water of 5 picocurries per liter (pCi/L) in groundwater at West Lake Landfill. The USGS report stated that the radium could simply be within background levels or be leaching from: a) RIM placed at the site in the 1970s; b) non-RIM wastes at the site; or c) naturally occurring radium in aquifer solids. See the April 2015 TASC fact sheet for a summary of the USGS groundwater report: http://issuu.com/westlakecag/docs/tasc_fact_sheet_-_summary_of_usgs_g.

To better determine the potential for RIM to leach radium into groundwater beneath West Lake Landfill, EPA is planning to perform a TCLP analysis on RIM collected from the landfill. This test is only one line of evidence that EPA will look at while investigating groundwater contamination related to West Lake Landfill.

What is the TCLP?

The TCLP simulates landfill conditions. It is used to determine if waste materials can be safely disposed of in landfills that accept nonhazardous wastes. Over time, water and other liquids percolate through landfills. The percolating liquid often reacts with the solid waste in a landfill and then carries these contaminants into groundwater beneath the landfill. The TCLP analysis determines whether the contaminants of interest (radium in the case of West Lake Landfill) are likely to leach into groundwater from the material in the landfill.

How is the TCLP performed?

The TCLP test models a theoretical scenario in which a waste is mismanaged by placing it in an unlined landfill containing municipal solid waste.

The test simulates the results of rainwater infiltrating the landfill, reacting with the municipal solid waste, and then leaching through the waste being tested.

The solid material to be tested must be reduced in size by crushing, grinding or cutting, unless the solid is smaller than one centimeter in its narrowest dimension (i.e., it can pass through a 0.375-inch standard sieve). This reduced-size sample of solid material is combined with an acetic acid solution (20 parts solution to 1 part solid material by weight) in a tightly closed container. This container is rotated at 32 rotations per minute for 20 hours. After rotation is complete, the solid material is filtered out and the liquid is analyzed for radium. The amount of radium, if any, present in the liquid will provide EPA with information about how RIM in West Lake Landfill could affect groundwater quality and whether it is likely that RIM is the source of radium present in groundwater beneath the landfill.

For more information about the TCLP, visit http://www3.epa.gov/epawaste/hazard/testmethods/faq/faq_tclp.htm.

Figure 1: Dissolved Radium Exceedances of Maximum Contaminant Levels (MCLs) during 2012 and 2013 Sampling Events (wells with average dissolved combined radium values above the MCL underlined and in bold) (Figure 13 from the December 2014 USGS report)